

CLAIMS

1. An information recording medium on which record information is recorded by forming a record mark, wherein

5 additional information is recorded by changing an average area of the record mark included in each predetermined first cycle, in comparison with a predetermined reference value.

2. The information recording medium according to claim 1, wherein

10 the record information is recorded in synchronization with a synchronization signal which appears in each predetermined second cycle, and

the additional information is recorded, by using the second cycle of the synchronization signal as the first cycle.

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3. The information recording medium according to claim 2, wherein the additional information is recorded, by using a cycle of a timing signal which is generated on the basis of the synchronization signal as the first cycle, instead of using the second cycle as the first cycle.

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4. The information recording medium according to claim 2, wherein the synchronization signal is a synchronization block which is included in a synchronization frame which is an information unit for recording the record information.

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5. The information recording medium according to claim 1, wherein the

additional information is phase-modulated and recorded.

6. The information recording medium according to claim 1, wherein
at least one portion of said information recording medium comprises a
5 PEP area in which PEP information is recorded by combining a mark area in
which a plurality of record marks are formed and an unrecorded area in
which the record mark is not formed, and

the additional information is recorded by changing the average area
of the plurality of record marks in the mark area.

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7. The information recording medium according to claim 1, wherein the
additional information is recorded by changing at least one of an average
length and an average width of the record mark in the each predetermined
first cycle.

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8. The information recording medium according to claim 7, wherein the
additional information is recorded by changing at least one of the average
length and the average width such that at least one of the average length and
the average width becomes long or short.

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9. The information recording medium according to claim 1, wherein a
plurality of same additional information are repeatedly recorded.

10. An information reproducing apparatus for reproducing the record
25 information recorded on said information recording medium according to
claim 1,

said information reproducing apparatus comprising:

a reproducing device for reproducing the record information and obtaining a reproduction signal;

an integrating device for obtaining an integrated value of the reproduction signal in the each first cycle obtained by said reproducing device; and

a generating device for generating the additional information on the basis of the integrated value obtained by said integrating device.

11. The information reproducing apparatus according to claim 10, wherein

the record information is recorded in synchronization with a synchronization signal which appears in each predetermined second cycle,

said information reproducing apparatus further comprises a synchronization signal detecting device for detecting the synchronization signal, and

said integrating device obtains the integrated value, by using the second cycle of the synchronization signal detected by said synchronization signal detecting device as the first cycle.

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12. The information reproducing apparatus according to claim 11, wherein said integrating device obtains the integrated value, by using a cycle of a timing signal which is generated on the basis of the synchronization signal detected by said synchronization signal detecting device as the first cycle, instead of using the second cycle as the first cycle.

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13. The information reproducing apparatus according to claim 10, wherein said integrating device resets the integrated value in the each first cycle.

5 14. The information reproducing apparatus according to claim 10, wherein

at least one portion of said information recording medium comprises a PEP area in which PEP information is recorded by combining a mark area in which a plurality of record marks are formed and an unrecorded area in
10 which the record mark is not formed, and the additional information is recorded by changing the average area of the plurality of record marks in the mark area, in comparison with the reference value,

said reproducing device obtains a PEP signal by reproducing the PEP information in the PEP area, and

15 said integrating device obtains an integrated value of the PEP signal by using a cycle in each which the PEP information is detected as the first cycle, instead of or in addition to obtaining the integrated value of the reproduction signal in the each first cycle.

20 15. The information reproducing apparatus according to claim 10, wherein

a plurality of same additional information are repeatedly recorded on said information recording medium,

said information reproducing apparatus further comprises a plurality
25 of storing devices, each of which is for adding the integrated value obtained by said integrating device in each of the plurality of same additional information

repeatedly recorded and for storing it therein, and

said generating device generates the additional information on the basis of the added integrated value.

- 5 16. The information reproducing apparatus according to claim 15, wherein said integrating device resets the added integrated value, in at least one case of a case where the integrated value stored in each of the plurality of storing devices is larger than a predetermined threshold value and a case where a certain time elapses.

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17. An information reproducing method of reproducing the record information recorded on said information recording medium according to claim 1,

said information reproducing method comprising:

- 15 a reproducing process of reproducing the record information and obtaining a reproduction signal;

an integrating process of obtaining an integrated value of the reproduction signal in the each first cycle obtained by said reproducing process; and

- 20 a generating process of generating the additional information on the basis of the integrated value obtained by said integrating process.

18. An information recording apparatus for recording record information onto an information recording medium,

25 said information recording apparatus comprising:

a recording signal generating device for generating a recording signal

for forming a record mark onto said information recording medium, on the basis of the record information;

an additional signal adding device for adding an additional signal to the recording signal, the additional signal indicating additional information
5 which is recorded by changing an average area of the record mark in each predetermined first cycle, in comparison with a predetermined reference value; and

a recording device for recording the record information and the additional information by forming the record mark while changing the
10 average area, on the basis of the recording signal to which the additional signal is added.

19. The information recording apparatus according to claim 18, wherein said information recording apparatus further comprises a
15 synchronization signal generating device for generating a synchronization signal which appears in each predetermined second cycle,

said recording signal generating device generates the recording signal for forming the record mark in synchronization with the generated synchronization signal, and

20 said additional signal adding device adds the additional signal, by using the second cycle as the first cycle.

20. The information recording apparatus according to claim 19, wherein said additional signal adding device adds the additional signal, by using a
25 cycle of a timing signal which is generated on the basis of the synchronization signal as the first cycle.

21. The information recording apparatus according to claim 18, wherein said recording device forms the record mark by irradiating laser light on the basis of a predetermined driving pulse, and irradiates the laser light while
5 changing at least a pulse width of the driving pulse on the basis of the recording signal to which the additional signal is added.

22. An information recording method of recording record information onto an information recording medium,

10 said information recording method comprising:

a recording signal generating process of generating a recording signal for forming a record mark onto said information recording medium, on the basis of the record information;

an additional signal adding process of adding an additional signal to
15 the recording signal, the additional signal indicating additional information which is recorded by changing an average area of the record mark in each predetermined first cycle, in comparison with a predetermined reference value; and

a recording process of recording the record information and the
20 additional information by forming the record mark while changing the average area, on the basis of the recording signal to which the additional signal is added.

23. A computer program for reproduction control to control a computer
25 provided in said information reproducing apparatus according to claim 10, said computer program making the computer function as at least one portion

of said reproducing device, said integrating device, and said generating device.

24. A computer program for recording control to control a computer
5 provided in said information recording apparatus according to claim 18, said
computer program making the computer function as at least one portion of
said recording signal generating device, said additional signal adding device,
and said recording device.